

## 1. Respondent Information

**February 10, 2022**

**Please complete the survey online by Friday, February 25th, 2022.**

**This survey intends to collect responses from all two- and four-year Ohio public institutions of higher education regarding a proposed alignment for a course in the the Air Transportation Career-Technical Assurance Guide (CTAG). In this survey, we are asking respondents to indicate whether or not the Ohio Department of Education (ODE) competencies align with the post-secondary learning outcomes for the CTAG course, or Career-Technical Alignment Number (CTAN).**

**The CTAN is:**

**Uncrewed Aircraft Systems (UAS)**

**A proposed CTAG course, also referred to as a CTAN, has been reviewed by post-secondary faculty. This CTAN was found to have learning outcomes similar to those of an Uncrewed Aircraft Systems (UAS) course serving the academic area of Air Transportation. With this in mind, post-secondary faculty have developed proposed alignments between an ODE course and the CTAN in UAS.**

**In this survey, you will be asked to review the alignment between post-secondary learning outcomes and the Ohio Department of Education (ODE) secondary career field technical content standards for the UAS CTAN.**

**In the alignment document, the 12 UAS endorsed post-secondary learning outcomes are numbered 1-12, respectively.**

**If approved, this CTAN will enable students who successfully complete an approved secondary career-technical UAS course to obtain a guarantee that credit will be awarded when entering Ohio public post-secondary institutions with a comparable course. To earn credit, students will be required to successfully complete the course and successfully pass an ODE end-of-course assessment which will be developed with post-secondary faculty input and assistance in the creation of exam items.**

**We ask that ONE REPRESENTATIVE complete this survey on behalf of your institution as soon as possible, but no later than FRIDAY, February 25th. Please share this survey with the person most familiar with the content and subject matter in Air Transportation. Following statewide endorsement, a formal announcement will be sent out. If your institution offers a course similar to the UAS CTAN, the announcement will be your indication to submit your course through the CEMS (Course Equivalency Management System).**

**Brian Strzempkowski from The Ohio State University is the lead faculty expert. He conducted the initial research and facilitated faculty panel discussions during the CTAG alignment process. Specific questions relevant to the content components of the alignment can be addressed to Brian (strzempkowski.1@osu.edu) with a carbon copy to Kristi Conrad (kconrad@highered.ohio.gov). Survey responses left in the form of comments will also be reviewed by the faculty members and a faculty panel.**

**We thank you in advance for your valuable input.**

**\* 1. Demographic Information about the person completing this survey**

Name

Institution

Department

Title

E-mail

Phone

**\* 2. Please indicate the type of institution that you represent**

☐

University

☐

Regional Campus

☐

Community College

## 2. Uncrewed Aircraft Systems (UAS) Course offering

\* 3. Does your institution offer a program or course in Uncrewed Aircraft Systems (UAS)?

☐ Yes

☐ No

### 3. Uncrewed Aircraft Systems (UAS) Proposed Alignment

Please review the proposed alignment document. The previously approved learning outcomes are in the left column, the alignment with the Ohio Department of Education Career Field Content Standards is in the right column.

#### CTAN PROPOSAL:

**Uncrewed Aircraft Systems (UAS):** Potential CTAN alignment between post-secondary learning outcomes in the Transportation Pathway Career Field Technical Content Standards of the Ohio Department of Education.

**Course Description:** The Uncrewed Aircraft Systems (UAS) course will provide an opportunity to learn about careers utilizing UAS, exploration of industries where UAS can be utilized, and the opportunity to earn a FAA Part 107 Remote Pilot certificate.

**Advising Notes:** Students must access credit within 3 years of course completion.

**Proposed Semester Credit Hours:** 3 Semester Credits

#### Proposed Alignment

Proposed Learning Outcomes	Competencies and/or Descriptors from the Air Transportation Pathway of the Career Field Technical Content Standards
1. Demonstrate a basic understanding of weather theory, hazardous weather situations, wind shear avoidance, and the procurement and use of graphical and textual weather products in order to identify current conditions and short-term forecasts.	7.5.5 Describe weather patterns and their impact on airport operations.  7.6.3 Explain the effects of temperature on weather.  7.6.6 Identify wind patterns based on weather systems.  7.6.11 Describe the types, conditions and factors of turbulence.  7.6.12 Describe the types and impact of thunderstorms, tornados, microbursts and hurricanes.  7.6.13 Describe wind and wind effects (i.e. crosswind, tailwind, windshear, mountain wave).  7.6.9 Describe weather system formation, including air masses and fronts.  7.11.3 Describe weather and environmental obstructions to visibility (e.g., smoke, haze, volcanic ash).  7.11.5 Describe potential flight hazards

<p>2. Demonstrate basic knowledge of the Federal Aviation Regulations that relate to Remote Pilot in command privileges, limitations, and flight operations.</p>	<p>7.1.5 Describe the role and function of the Federal Aviation Administration (FAA).</p> <p>7.1.6 Describe the major FAA categories of aircraft.</p> <p>7.9.1 Describe regulatory requirements for certification, rating, inspection, reporting and compliance for small-unmanned aircraft systems.</p> <p>7.9.2 Describe registration requirements for small-unmanned aircraft systems.</p> <p>7.9.3 Describe operating rules for small-unmanned aircraft systems.</p> <p>7.11.1 Describe pilot qualifications.</p>	
<p>3. Demonstrate the ability to interpret aeronautical charts in order to identify airspace classification, airport locations, obstructions, and other hazards that may affect a UAS flight</p>	<p>7.1.9 Describe classes of airspace and associated requirements and limitations.</p> <p>7.5.1 Describe the different types of controlled and uncontrolled airports within the United States.</p> <p>7.5.2 Differentiate between towered and non-towered airports.</p> <p>7.11.6 Describe the Notice to Air Missions (NOTAM) system and its use.</p> <p>7.11.88 Define and describe piloting requirements for special use airspace (SUA), special flight</p>	

## Proposed Alignment

Proposed Learning Outcomes	Competencies and/or Descriptors from the Air Transportation Pathway of the Career Field Technical Content Standards
4. Identify the need for permission to fly in certain types of airspace and be able to utilize the appropriate systems to obtain those permissions	7.13.2 Determine right of way and describe minimum safe altitude rules.
5. Recognize when a waiver is needed for a flight, and understand the process to seek a waiver from the FAA	7.9.5 Describe small-unmanned aircraft waiver policy and requirements. 7.13.20 Analyze the challenges of night operations.
6. Demonstrate an understanding of the aerodynamics that allow a UAS to fly, and how the shape and size of a UAS can change aerodynamic elements; identify sensor types and capabilities	7.4.2 Describe the forces of flight and the three axes of motion. 7.4.3 Define Newton's Laws of Motion and Bernoulli's Principle. 7.4.4 Identify the parts of an airfoil and describe how an airfoil works. 7.4.5 Describe how aircraft configuration affects performance. 7.4.6 Discuss the role of thrust and the relationship between lift and drag.

## Proposed Alignment

Proposed Learning Outcomes	Competencies and/or Descriptors from the Air Transportation Pathway of the Career Field Technical Content Standards
7. Demonstrate a basic knowledge of the performance limitations of UASs, and how to properly plan and conduct a flight within those limitations (weight and balance)	<p>7.4.9 Describe the effects of loading, weight and balance on center of gravity and aircraft performance.</p> <p>7.4.10 Describe the design and power features that affect aircraft stability, performance and limitations.</p> <p>7.4.16 Define load factor and G-forces.</p> <p>7.9.4 Describe operating limitations for small-unmanned aircraft systems.</p> <p>7.11.9 Calculate performance and limitations.</p>
8. Identify when crew resource management (CRM) and single pilot resource management (SRM) is essential to a flight, and describe the elements of effective CRM and SRM, including proper radios phraseology.	<p>7.7.7 Describe radio communication, phraseology and light signals.</p> <p>7.9.6 Determine required crew roles (CRM, SRM)</p> <p>7.9.7 Describe the purpose of visual observers, control stations and autonomous operations.</p> <p>7.9.8 Describe pre-flight, in-flight and post-flight communications procedures.</p>
9. Describe how safe, effective decisions pertain to a UAS flight, and how hazardous attitudes can degrade safety; ADM, PAVE, IM SAFE	<p>7.8.2 Identify hazardous attitudes of flight.</p> <p>7.8.6 Describe the decision making process in flight and steps to break the chain of poor judgement.</p> <p>7.14.1 Describe emergency operations.</p> <p>7.14.4 Describe systems and equipment malfunctions.</p> <p>7.14.15 Describe loss of aircraft control link and fly-a-ways.</p> <p>7.14.16 Describe loss of Global Positioning System (GPS) signal during flight and potential consequences.</p>

## Proposed Alignment

Proposed Learning Outcomes	Competencies and/or Descriptors from the Air Transportation Pathway of the Career Field Technical Content Standards
10. Demonstrate an understanding of the UAS industry and how their inclusion across multiple industries can lead to career opportunities	<p>1.1.1 Identify the knowledge, skills and abilities necessary to succeed in careers.</p> <p>1.1.2 Identify the scope of career opportunities and the requirements for education, training, certification, licensure and experience.</p> <p>1.6.1 Identify business opportunities.</p>
11. Describe the ability to effectively pilot a UAS, and the process involved to initiate, conduct and terminate the flight safely	<p>7.11.14 Perform and analyze a preflight assessment.</p> <p>7.11.16 Demonstrate proper engine starting.</p> <p>7.11.18 Perform a before takeoff check.</p> <p>7.12.1 Describe takeoffs, landings, and go-arounds.</p> <p>7.12.2 Demonstrate a normal takeoff and climb.</p> <p>7.12.3 Demonstrate a normal approach and landing.</p> <p>7.12.10 Demonstrate post-flight procedures.</p> <p>7.14.2 Demonstrate emergency descent.</p>
12. Describe a basic understanding of preflight inspection, maintenance, and troubleshooting	<p>7.11.2 Explain airworthiness requirements.</p> <p>7.11.13 Describe operation of systems.</p> <p>7.11.14 Perform and analyze a preflight assessment.</p> <p>7.14.14 Describe characteristics and potential hazards of batteries and other fuel sources.</p>



#### 4. Endorsement and Aligned Course

\* 4. Do the Ohio Department of Education competencies align with the endorsed post-secondary learning outcomes for Uncrewed Aircraft Systems (UAS)?

☐ Yes

☐ No

If you feel there was a major omission in the competencies to support a learning outcome, please indicate.

\* 5. Does your institution have a course or courses similar to or closely aligned with the content outlined in the post-secondary learning outcomes and the aligned ODE content?

☐ Yes

☐ No

If yes, please indicate the course number and title (e.g., ITNS2535 - Introduction to IT and Networking).

## 5. Course Information for Uncrewed Aircraft Systems (UAS)

\* 6. Regarding the course you indicated was most like Uncrewed Aircraft Systems, for what program or programs is this course a requirement? (Please mark all that apply)

- ☐ Certificate Program
- ☐ Associate of Arts
- ☐ Associate of Science
- ☐ Associate of Applied Science
- ☐ Bachelors of Arts
- ☐ Bachelors of Science

Other (please specify)

\* 7. Regarding the course you suggest is most like Uncrewed Aircraft Systems (UAS), is the course an introductory course (i.e., one that is typically available with little to no prerequisite college-level coursework and offered in the freshman or sophomore year)?

- ☐ Yes
- ☐ No

If no, please list prerequisites:

## 6. Additional Comments and Endorsement of Uncrewed Aircraft Systems (UAS)

8. Are there additional comments that you would like to make known to the faculty panel that proposed the CTAN, Uncrewed Aircraft Systems (UAS)?

\* 9. Do you support the development of this statewide articulation agreement in Uncrewed Aircraft Systems (UAS)?

☐ Yes

☐ No

Comments:

## 7. Thank You!

**Thank you for completing this survey.**